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## (54) Car seat outlet in air distribution system

(57) A heater air distribution system is provided for a passenger car which has front and rear seats (11, 12) so arranged as to provide a space for the feet of a rear seat passenger below or immediately behind the rear of a front seat. The system comprises a first duct (22) leading from a heater unit to a transfer port (26) and a further duct (27) mounted on the seat (11) and extending from the transfer port to an outlet (32). The outlet is carried by a front seat and is arranged to direct heated air to the feet of a rear seat passenger. A flexible hose or sliding interconnection manifold may be provided to lateral or central supply ducting.

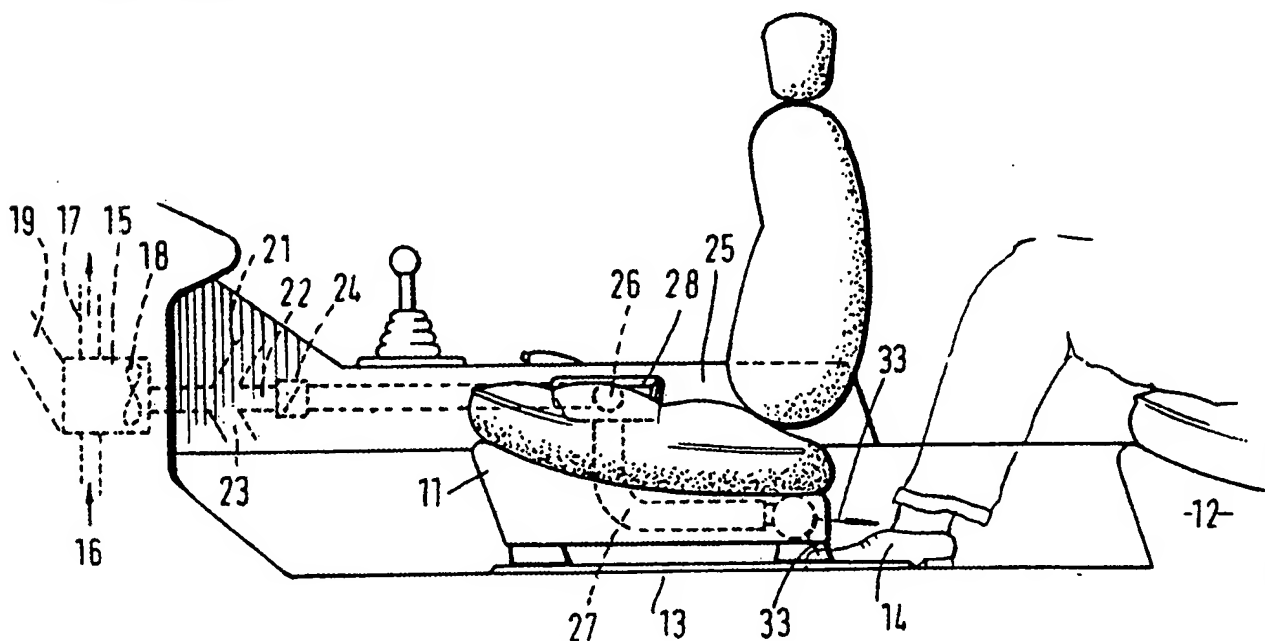


FIG. 1.

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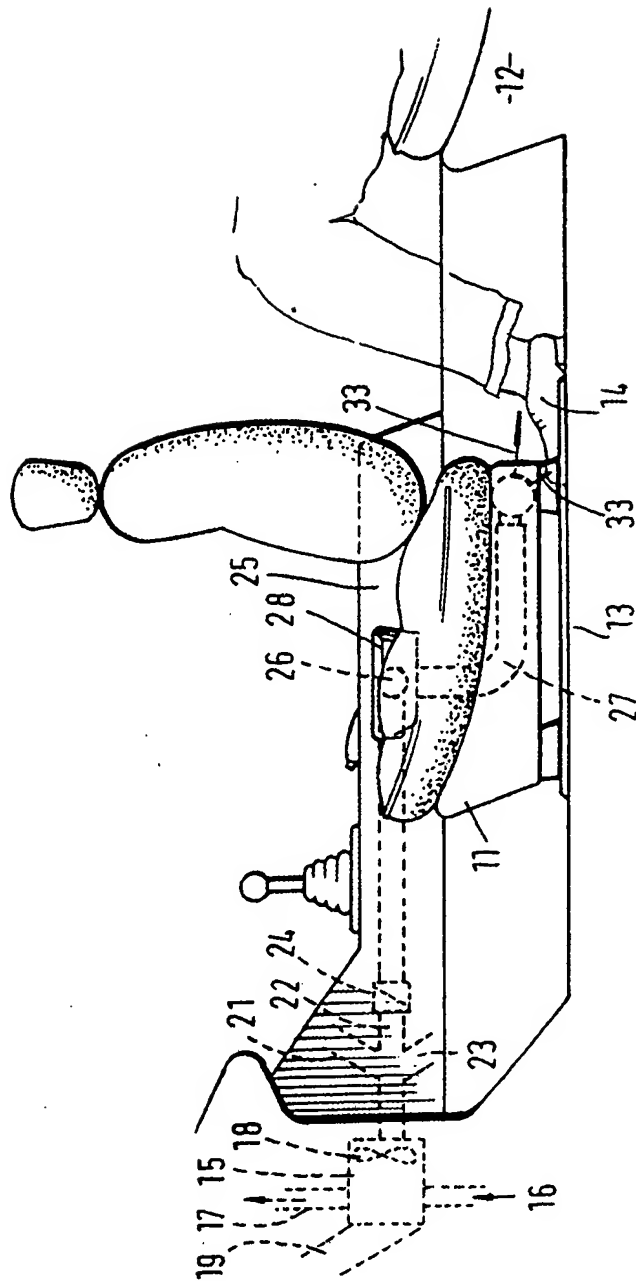


FIG. 1

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FIG. 2

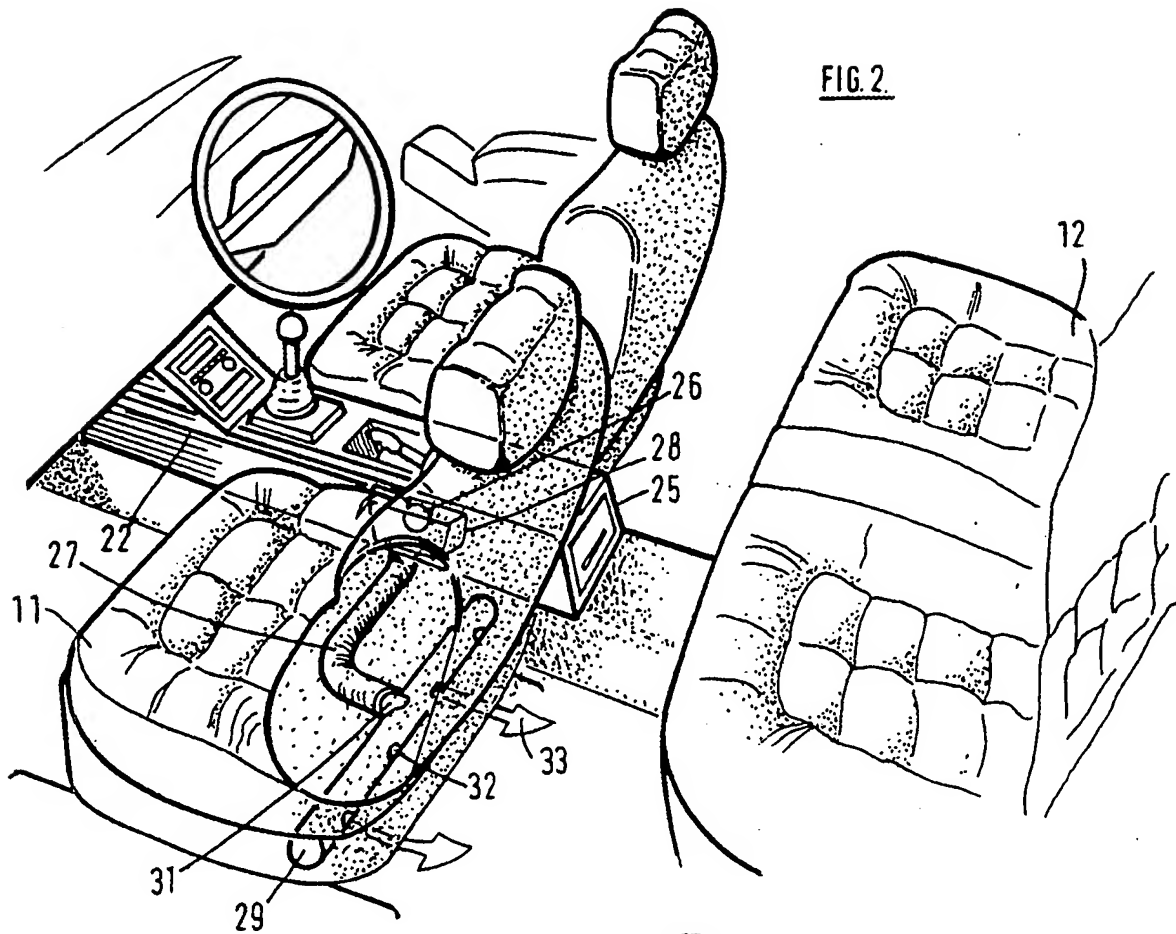
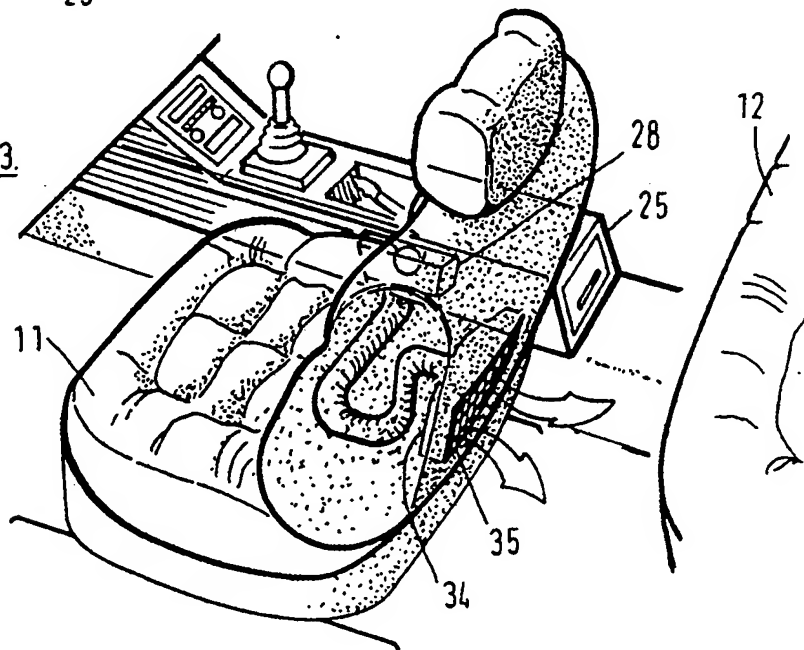


FIG. 3



HEATER AIR DISTRIBUTION SYSTEM FOR PASSENGER CAR

The invention relates to heater air distribution systems for passenger cars having front and rear seats so arranged to provide a space for the feet of a rear passenger below or immediately behind the rear of a front seat.

- 05 Conventional heating systems for the interior of passenger cars incorporate a heat exchanger which includes a matrix of heated surfaces which are heated by engine coolant or possibly from the exhaust system of the vehicle. Air is forced by means such as a fan from outside the vehicle past
- 10 the heated surfaces to a heater air distribution system which then distributes heated air to required locations in the interior of the vehicle. The vehicle passenger compartment is provided with outlets to the exterior of the car to allow continuous flow of air through the vehicle
- 15 interior. Means may be provided for mixing unheated air with the heated air to control the degree of heating. Provision is also sometimes made for recirculation of air from the interior of the vehicle through the heater matrix instead of or in addition to the supply of fresh air.
- 20 A heater air distribution system normally includes a series of ducts ending in outlets and valves within the ducts to enable air to be directed selectively to various parts of

the interior of the vehicle. Typically heated air can be directed to the windscreen, the front side windows, the front footwells and other areas near the front of the vehicle. There may also be ducts running along a central console between the front seats and ending in outlets directed towards the rear seat passengers.

To provide heating for the feet of rear seat passengers it is normal to provide some space under the front seats and to allow heated air to pass from the front footwell area under the seats towards the feet of a rear seat passenger. This does not normally provide a sufficiently positive distribution of heated air to keep the rear seat passenger's feet warm.

An object of the present invention is to provide a means for directing heater air more positively to the feet of a rear seat passenger.

In accordance with the present invention a heater air distribution system for a passenger car having front and rear seats so arranged as to provide a space for the feet of a rear seat passenger below or immediately behind the rear of a front seat comprises a first duct leading from a heater unit to a transfer port adjacent a front seat, a further duct mounted on the seat and extending from the

transfer port to an outlet, the outlet being carried by a front seat and arranged to direct heated air to the feet of a rear seat passenger.

Preferably the inlet to the further duct incorporates an  
05 elongated opening arranged to be in register with the transfer port for a range of positions of the front seat. Alternatively, the transfer port may be connected to the second duct through a flexible hose arranged to maintain communication between the outlet and the further duct  
10 despite movement of the position of the front seat.

Preferably the first duct extends longitudinally of the vehicle within a console provided between the front seats.

The outlet may comprise a tubular member fixed to or forming part of the front seat structure, extending  
15 transversely of the front seat structure and incorporating a series of downwardly and/or rearwardly directed openings. Alternatively, the outlet may comprise a grille arranged in the lower rear part of the front seat provided with fixed or movable vanes for directing heated air to the  
20 desired position.

Two embodiments will now be described by way of example

only with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic side elevation of a first embodiment showing the heater and relevant parts of the heater air distribution system;

05 Figure 2 is a perspective view of the heater air distribution system for a rear seat passenger;

and

Figure 3 is a view corresponding generally to Figure 2, showing an alternative.

10 Figure 1 is a diagrammatic side elevation of parts of a vehicle showing a front seat 11 and a rear seat 12 which together define a front passenger compartment and a rear passenger compartment for the car. The front seat 11 is mounted in a conventional manner on runners 13 which allow  
15 the seat to be moved longitudinally to a number of positions to adapt the interior of the vehicle to passengers of different sizes. The normal position for the feet of a rear seat passenger is represented diagrammatically by a passenger's foot 14.

20 A heater unit for the car comprises a heat exchanger 15

which is not shown in detail but comprises a matrix of tubes heated by liquid engine coolant which is caused to flow through the heat exchanger from an inlet 16 to an outlet 17. An electrically driven fan 18 causes air to be  
05 drawn in through the heat exchanger from an inlet 19 communicating with the atmosphere outside the car and the thus heated air is distributed within the car through a series of ducts such as the ducts 21, 22 and 23. Air inlet 19 may be positioned in a high pressure area causing some  
10 flow even when the fan 18 is not in operation. There may also be provision for drawing air into the heater inlet from the interior of the car instead of or in addition to drawing air from outside the car.

Some or all of the ducts such as 21, 22 and 23 are provided  
15 with air flow control valves as illustrated diagrammatically by the simple butterfly valve 24 in duct 22. These valves allow some ducts to be closed off thereby tending to concentrate the supply of heated air into other such ducts.

20 Duct 22 extends longitudinally along the interior of a longitudinally extending central console 25 which passes between front seat 11 and another front seat on the opposite side of the vehicle. Duct 22 terminates in a transfer port 26 immediately adjacent the cushion of seat



11. Seat 11 has mounted thereon a further duct 27 which at one end terminates in an elongated plenum 28 which has an elongated inlet arranged to cover the port 26 throughout the whole range of available movement of the seat 11 along its runners 13. The plenum 28 lies close to the surface of the console 25. The surface of the console may be a deep pile material such that there is an almost complete seal without interfering with free movement of the seat. In order to cater for vertical seat adjustment, the depth of the opening in plenum 28 is slightly greater than that of the port 26.

The rear lower part of seat 11 is provided with a transverse tube 29 most clearly seen in Figure 2. The tube has a central connection via a stub tube 31 with duct 27 and also has a series of downward and rearwardly directed outlets 32 at various positions along its length. The ends of tube 29 are closed. The outlets 32 are so arranged as to direct air expelled from them at the feet 14 of a rear seat passenger as indicated by arrows 33 in Figure 1. Tube 29 may be an integral part of the seat structure or it may be a tube carried by the seat for the purpose of distributing heated air. To prevent excessive heat loss by conduction through the walls of various ducts or tubes they should either be constructed of an insulating material or coated with such a material.

Only one side of the vehicle is shown, but the arrangement is symmetrical to provide corresponding heater air distribution on the other side of the car.

In a minor modification, the duct 27 may communicate with one end of the tube 29. In a still further modification, the tube 29 may serve as the duct and outlet and may have the plenum 28 connected directly to the end thereof; this clearly requires appropriate repositioning of the port 26 to correspond to the position of plenum 28.

In use, when heating is required for the feet of a rear seat passenger, valve 24 is opened and the fan 16 is operated. Coolant circulates through the heat exchanger in a conventional manner. Cold air is drawn in through inlet 19 across the heated surfaces within the heat exchanger 15 and is impelled by fan 18 along duct 22 to port 26. Air expelled from port 26 is collected in plenum 28 and distributed through duct 27 and outlets 32 in tube 29 to the footwell area for rear seat passengers so as to heat the feet 14 of a rear passenger. Other parts of a rear seat passenger may be heated through other ducts or warm air may simply be allowed to pass upward from the rear footwell area to provide general heating of the rear compartment. The passenger compartment is vented to atmosphere to allow continuous flow of air.

A control for the valve 24 may be provided within the reach of a rear seat passenger so that he can control his environment. Alternatively such a control may be grouped with other heater controls in a position suitable for  
05 operation by the vehicle driver.

Figure 3 shows an alternative construction for various parts of the heater air distribution system associated with the vehicle front seat. Other parts of the system remain as described with reference to Figures 1 and 2. Instead of  
10 a tube 29, a plenum 34 is arranged to have a rearwardly directed outlet in the base of the back of seat 11. A grille 35 covering the outlet may incorporate movable vanes to enable the heated air to be directed as desired or fixed vanes to direct the air in a pre-determined direction.

15 In a still further alternative construction, port 26 is arranged below the seat 11 and a flexible hose is connected positively to the outlet 28 and to the duct 27. The hose then flexes as the seat is moved to provide effective communication between duct 22 and duct 27 for all positions  
20 of the seat 11. With such an arrangement it is possible to cater for a seat which is movable vertically as well as horizontally.

In a modification, the ducts 22 may be provided along the outer edges of the vehicle instead of in a central console.

CLAIMS

1. A heater air distribution system for a passenger car having front and rear seats so arranged as to provide a space for the feet of a rear seat passenger below or immediately behind the rear of a front seat comprising a  
05 first duct leading from a heater unit to a transfer port adjacent a front seat, a further duct mounted on the seat and extending from the transfer port to an outlet, the outlet being carried by a front seat and arranged to direct heated air to the feet of a rear seat passenger.
- 10 2. A heater air distribution system as claimed in Claim 1 wherein the inlet to the further duct incorporates an elongated opening arranged to be in register with the transfer port for a range of positions of the front seat.
- 15 3. A heater air distribution system as claimed in Claim 1 wherein the transfer port is connected to the second duct through a flexible hose arranged to maintain communication between the outlet and the further duct despite movement of the position of the front seat.
- 20 4. A heater air distribution system as claimed in any one of the preceding claims wherein the first duct extends longitudinally of the vehicle within a console provided

between the front seats.

5. A heater air distribution system as claimed in any one of the preceding claims wherein the outlet comprises a tubular member fixed to or forming part of the front seat  
05 structure, extending transversely of the front seat structure and incorporating a series of downwardly and/or rearwardly directed openings.

6. A heater air distribution system as claimed in any one of Claims 1 to 4 wherein the outlet comprises a grille  
10 arranged in the lower rear part of the front seat provided with fixed or movable vanes for directing heated air to the desired position.

7. A heater air distribution system substantially as described with reference to and as illustrated by the  
15 accompanying drawings.